

INTRODUCTORY COMMENTS

Present Status of Claims

- Original claims **1-60** are pending.
- Claims **27-33, 39, 40 and 42-60** have been withdrawn from consideration as being drawn to non-elected embodiments.
- Claims **1-20** have been allowed.
- Claims **21-26, 34, 35 and 38** have been rejected.
- Claims **36, 37 and 41** are objected to.

AMENDMENTS TO THE CLAIMS

Please amend the Claims as follows:

1. (ORIGINAL) A package with an integral window for housing a microelectronic device, comprising a monolithic multilayered body with an integral window; wherein the body comprises:
 - a first sub-stack comprising at least one layer of an electrically insulating multilayered material, a first aperture disposed through the first sub-stack, and a first electrical conductor disposed on the top surface of the first sub-stack;
 - a second sub-stack comprising at least one layer of the electrically insulating multilayered material, a second aperture disposed through the first sub-stack, and a second electrical conductor disposed on the top surface of the second sub-stack;
 - a third sub-stack comprising at least one layer of the electrically insulating multilayered material and a third aperture disposed through the third sub-stack; and

an integral window disposed across the first aperture;
wherein the second sub-stack is stacked on top of the first sub-stack, and the third sub-stack is stacked on top of the second sub-stack;
wherein the third aperture is wider than the second aperture;
wherein the second aperture is wider than the first aperture; and
wherein the integral window is bonded directly to the body without having a separate layer of adhesive material disposed in-between the window and the body.
2. (ORIGINAL) The package of claim 1, wherein the window is bonded directly to a lip recessed inside of the body.
3. (ORIGINAL) The package of claim 1, wherein the geometrical relationship between the window and the body comprises an encased joint geometry.

4. (ORIGINAL) The package of claim 1, wherein the geometry of the outer edge of the window comprises a self-locking geometry selected from the group consisting of a tapered outer edge, a convex rounded outer edge, and a chevron-shaped double-tapered outer edge.
5. (ORIGINAL) The package of claim 1, wherein the window is disposed on the bottom surface of the first sub-stack and extends laterally along the bottom surface of the first sub-stack a sufficient distance beyond the periphery of the first aperture to provide a sufficiently large overlapping area to provide a sufficiently high bond strength.
6. (ORIGINAL) The package of claim 1, wherein the window substantially fills the aperture.
7. (ORIGINAL) The package of claim 6, wherein the window is formed by casting a castable window material directly into the aperture.
8. (ORIGINAL) The package of claim 7, wherein the castable window material comprises a molten glass that has solidified after casting or a transparent liquid polymer that has hardened after casting.
9. (ORIGINAL) The package of claim 1, wherein the window comprises an optically transparent material selected from the group consisting of glass, sapphire, fused silica, clear plastic, and clear polymer.
10. (ORIGINAL) The package of claim 1, wherein the window comprises a material selected from the group consisting of silicon, germanium, metal, metal alloy, lithium niobate and lithium tantalate.
11. (ORIGINAL) The package of claim 1, wherein the window comprises a material selected from the group consisting of barium fluoride, calcium fluoride, lithium fluoride, magnesium fluoride, potassium fluoride, sodium chloride, zinc oxide, and zinc selenide.
12. (ORIGINAL) The package of claim 1, wherein the window comprises an anti-reflection coating.
13. (ORIGINAL) The package of claim 1, wherein the window comprises means for filtering selected wavelengths of light.

14. (ORIGINAL) The package of claim 1, wherein the window further comprises a lens for optically transforming the light that passes through the window.
15. (ORIGINAL) The package of claim 1, wherein the window further comprises an array of binary optic lenslets for optically transforming the light that passes through the window.
16. (AMENDED) The package of claim 1, wherein the multilayered material comprises a low-temperature cofired ceramic material fired at a temperature from about 600 °C to about 1000 °C.
17. (AMENDED) The package of claim 1, wherein the multilayered material comprises a high-temperature cofired ceramic material fired at a temperature from about 1300 °C to about 1800 °C.
18. (ORIGINAL) The package of claim 1, wherein the multilayered material comprises a polymer-based printed wiring board material.
19. (ORIGINAL) The package of claim 1, wherein at least one electrical conductor comprises a thick-film metallized trace.
20. (ORIGINAL) The package of claim 1, wherein at least one electrical conductor comprises an electrical lead.
21. (ORIGINAL) A package with an integral window for housing a microelectronic device, comprising:
 - a monolithic body, comprising a electrically insulating multilayered material; the body having a bottom surface, an opposing top surface, a stepped aperture disposed through the body, and at least two interior ledges;
 - a first electrical conductor disposed on the first interior ledge;
 - a second electrical conductor disposed on the second interior ledge;
 - an integral window disposed across the aperture and bonded directly to the body without having a separate layer of adhesive material disposed in-between the window and the body; and
 - a first microelectronic device flip-chip interconnected to the first electrical conductor on the first interior ledge.

22. (ORIGINAL) The package of claim 21, wherein the first microelectronic device comprises a chip selected from the group consisting of a semiconductor chip, a CCD chip, a CMOS chip, a VCSEL chip, a laser diode chip, a LED chip, a MEMS chip, and a IMEMS chip.
23. (ORIGINAL) The package of claim 21, wherein the first microelectronic device comprises a light-sensitive side facing the window.
24. (ORIGINAL) The package of claim 21, further comprising a polymer underfill encapsulating at least one of the flip-chip electrical interconnections.
25. (ORIGINAL) The package of claim 21, further comprising a continuous ring seal disposed in-between the first microelectronic device and the body.
26. (ORIGINAL) The package of claim 25, wherein the atmosphere in-between the window and the ring seal comprises a dry inert gas other than air, selected from the group consisting of argon, nitrogen, and helium, and combinations thereof.
27. (ORIGINAL) The package of claim 21, further comprising a second microelectronic device, mounted back-to-back to the first microelectronic device.
28. (ORIGINAL) The package of claim 27, wherein the second microelectronic device is wirebonded to the second electrical conductor.
29. (ORIGINAL) The package of claim 28, wherein the wirebond and the pair of microelectronic devices are substantially encapsulated in a polymer-based encapsulant, except for any light-sensitive surfaces.
30. (ORIGINAL) The package of claim 29, further comprising an opening in the polymer-based encapsulant for providing open access to the front side of the second microelectronic device.
31. (ORIGINAL) The package of claim 30, wherein the opening in the polymer-based encapsulant is defined by a dam that encircles at least some of the front side of the second microelectronic device, which prevents any encapsulant from occluding the front side of the second microelectronic device during encapsulation of the wirebond.
32. (ORIGINAL) The package of claim 21, further comprising a wirebond interconnect made from the backside of the first microelectronic device to the second electrical conductor on the second interior ledge.

33. (ORIGINAL) The package of claim 32, wherein the wirebond interconnect and the backside of the first microelectronic device are substantially encapsulated in a polymer-based encapsulant.

34. (ORIGINAL) The package of claim 21, further comprising a cover lid attached to the top surface of the body for sealing the package.

35. (ORIGINAL) The package of claim 34, wherein the cover lid is attached to the body with a material selected from the group consisting of a hermetic sealant and a polymer-based adhesive.

36. (AMENDED) ~~The package of claim 34~~ A package with an integral window for housing a microelectronic device, comprising:

a monolithic body, comprising a electrically insulating multilayered material; the body having a bottom surface, an opposing top surface, a stepped aperture disposed through the body, and at least two interior ledges;

a first electrical conductor disposed on the first interior ledge;

a second electrical conductor disposed on the second interior ledge;

an integral window disposed across the aperture and bonded directly to the body without having a separate layer of adhesive material disposed in-between the window and the body; and

a first microelectronic device flip-chip interconnected to the first electrical conductor on the first interior ledge; and

further comprising a cover lid attached to the top surface of the body for sealing the package;

wherein the cover lid is transparent.

37. (AMENDED) ~~The package of claim 34~~ A package with an integral window for housing a microelectronic device, comprising:

a monolithic body, comprising a electrically insulating multilayered material; the body having a bottom surface, an opposing top surface, a stepped aperture disposed through the body, and at least two interior ledges;

a first electrical conductor disposed on the first interior ledge;

a second electrical conductor disposed on the second interior ledge;

an integral window disposed across the aperture and bonded directly to the body without having a separate layer of adhesive material disposed in-between the window and the body; and

a first microelectronic device flip-chip interconnected to the first electrical conductor on the first interior ledge; and

further comprising a cover lid attached to the top surface of the body for sealing the package;

wherein the cover lid comprises a window.

38. (ORIGINAL) The package of claim 34, wherein the atmosphere inside the sealed package comprises a dry inert gas other than air, selected from the group consisting of argon, nitrogen, and helium, and combinations thereof.

39. (ORIGINAL) The package of claim 21, further comprising a second microelectronic device flip-chip bonded to the second conductor on the second interior ledge.

40. (ORIGINAL) The package of claim 28, wherein the body further comprises a third electrical conductor disposed on a third interior ledge, and further wherein the second microelectronic device has a wirebond interconnection to the third electrical conductor.

41. (AMENDED) ~~The package of claim 23~~ A package with an integral window for housing a microelectronic device, comprising:

a monolithic body, comprising a electrically insulating multilayered material; the body having a bottom surface, an opposing top surface, a stepped aperture disposed through the body, and at least two interior ledges;

a first electrical conductor disposed on the first interior ledge;

a second electrical conductor disposed on the second interior ledge;

an integral window disposed across the aperture and bonded directly to the body without having a separate layer of adhesive material disposed in-between the window and the body; and

a first microelectronic device flip-chip interconnected to the first electrical conductor on the first interior ledge;

wherein the first microelectronic device comprises a light-sensitive side facing the window;

wherein the package is mounted on, and is electrically interconnected to, a printed wiring board; wherein the printed wiring board comprises an opening through the board; and wherein the aperture in the package is aligned with the opening in the printed wiring board, thereby allowing light to pass through both the opening and the aperture to interact with the light-sensitive side of the first microelectronic device.

42-60. (CANCELLED)